

## **EVALUATION OF INTEGRATED PROGRAM ON NUTRITION AND HEALTH: ESTIMATES AND EVIDENCE FROM ICDS**

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### **1. Introduction**

In recent years, policymakers have increasingly promoted early childhood nutrition programs as a means to raise living standards in developing countries. Proponents of such programs argue that improved diet, particularly in the crucial first years of life, enhances intellectual development and ultimately, academic success. Their view is that, in addition to having direct health benefits, early childhood nutrition programs could also be an instrument of education policy. These findings have prompted governments and other agencies to invest heavily in children before formal schooling begins. It has led to many targeted childhood intervention programs. There has been evolution of comprehensive, holistic and multilevel interventions, which employ programs, services and benefits that target outcomes across child, parent and community domains.

The need for these holistic programs arises due to the high prevalence of malnutrition levels that prevail across the world. India has a dismal performance in nutritional status of children. National level data of India reveals that the proportion of children who are severely undernourished (below 3 standard deviations from median) is very high: 24 percent are severely stunted and 16 percent are severely underweight. About 20 per cent of children under five years of age suffer from wasting, another major problem that India faces.

The Integrated Child Development Services (ICDS) program was launched in 1975. ICDS is designed to promote holistic development of children under six years, through the strengthened capacity of caregivers and communities and improved access to basic services, at the community level. Within this group, priority is accorded to addressing the critical prenatal–under three years age group, the period of most rapid growth and development. The program is specifically designed to reach disadvantaged and low income groups.

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## 2. Objectives of the Study

This study aims to estimate the impact of ICDS on nutritional status of children. The objectives are:

1. Estimate program effects using child health models within the framework of health production and demand for health inputs. Using the latest National Family Health Survey-3 (NFHS-3) data, we study the effect of the program on the anthropometric measures of child health status. While performing this analysis, we also highlight the role played by related socio-economic correlates of nutritional status, especially those related to the mother of the child. There have been only few studies on large sample size and all-India level that have attempted this. We use anthropometric measures as indicators of child health and estimate effect of being in the program area.
2. Quality of ICDS has been a much talked about issue. Improvement in quality has been the emphasis on numerous studies that evaluate the functioning and effectiveness of ICDS. However, to our knowledge, there has been no attempt to define and access quality in an econometric modelling framework. This study adds a new dimension by emphasising the importance of quality of Anganwadi Worker (AWC). We create an index of quality and use this index as a tool to understand the factors affecting utilization of ICDS services. This aspect has not been addressed adequately in the program evaluation studies of ICDS. We use a unique data set for this analysis.
3. The low rates of registration and utilization of the ICDS services is a major concern. An in-depth analysis of data is carried on within the child health demand framework to study factors that determine these.
4. This study aims to contribute to the literature of program evaluation of social programs that prescribe random assignment of programs and employ comparison of mean effects to others that use analytical tools to correct for non-random assignment of programs and control for omitted variables. We use more rigorous econometric tools to assess program effects. We use logistic and multivariate regression models for estimation. We try to improve upon results by the use of more econometrically robust method of propensity score matching.
5. We analyse data from latest sources to understand the coverage, spread and utilization of ICDS.

### **3. Methodology**

The theoretical approach we follow in this analysis is based on Becker's microeconomic models of household production. Households allocate resources for production of goods and services that are either sold in the market or consumed at home. This work has been extensively used in many studies to estimate health or anthropometric production functions relating child height or child weight. We use the model as laid out by Strauss and Thomas. For estimation, we assume that the reduced-form demand function is linear.

For a particular child, the health function can be written as:

$$H_{ijt} = b_0 + b_1 Z_1 + b_2 Z_2 + b_3 ICDS + u$$

where ICDS refers to the program (treatment) area, one of the possible household resources, that has been singled out because of its central interest for our analysis. We wish to obtain an estimate of the impact of ICDS on child anthropometric measures of health, i.e., a good estimate of the parameter  $b_3$ . ICDS refers to the presence of the program.  $Z_1$  refers to all the child-related factors and  $Z_2$  refers to a set of the parental and household factors.  $u$  is the disturbance term. The parameters that are to be estimated are the vector of coefficients given by  $b$ . The basic estimation problem is that there are likely to be many unobserved variables that affect child nutritional status within this framework and that may be correlated with whether a particular child in a particular household is in the ICDS program area. For example, a household with access to ICDS may be more likely to take advantage of the program if the parents have greater concern about their children's welfare and future prospects, if the parents are more educated, if they belong to a particular caste or religion or if the local environment is relatively unhealthy. As a result, if there is no control for such factors, the estimated  $b_3$  will be contaminated by omitted variable bias and may differ substantially and possibly even in sign from the true value. The estimation strategy used in this study controls for such factors. Squares terms of regressors as well as interaction terms between the covariates are introduced in the empirical specifications to account and control for any nonlinearity.

The empirical specifications involve estimations of five variants of the model: In the base model, we include only the program variable. In the second model, the program effect controlling for only the individual characteristics is examined. We include maternal factors in the third model. The fourth model controls for all paternal and household characteristics.

The full model includes all the controls including the interaction terms. We estimate these models for different age groups, gender, states and varying program definitions.

#### 4. Estimation

(i) *Program Impact*: We test for the effect on program on two measures of child health: Weight-for-age (WAZ) and height-for-age (HAZ). A child's weight-for-age Z-score (WAZ), the most commonly used measure of child nutritional status, is a summary measure of weight-for-age. A child is considered to be "underweight" if WAZ is less than  $-2$  standard deviations from the international reference. Wasting is another measure of nutritional status defined as low weight-for-height, and is often associated with starvation and/or severe disease. The anthropometric index of height-for-age (HAZ) reflects pre and post-natal growth, and deficits in height-for-age show the "long-term, cumulative effects of inadequacies of nutrition and/or health". A child is classified as "stunted" if her or his HAZ is below  $-2$  standard deviations from the median of the National Centre for Health Statistics/World Health Organization international growth reference.

(ii) *Quality and Utilization of ICDS*: Quality of ICDS has been a widely researched area but attempts to quantify it and capture the effects of quality on utilization have been few. We create an index of quality of ICDS/AWC and use it in a multivariate framework to understand the factors that affect utilization of ICDS.

#### 5. Results

(i) *Program Impact*: We estimate several models to analyse the effect of being in the program area on the nutritional status of children. The coefficient of the program/treatment area is positive and significant. From our analysis we can conclude the following regarding program impact:

1. ICDS program has a positive effect on the nutritional status of children. We found that those living in the program area had better health than those living in the non-program area.
2. The socio-economic correlates that affect of nutritional status of the child include: education of mother (children mothers who had completed high school showed better health as compared to children of less educated mothers), caste (children belonging to scheduled caste and scheduled tribes showed worse health as compared to general category), religion (Muslim children were less healthier as compared to Hindu children) and wealth (children belonging to wealthier families were healthier).

3. There seem to be gender differential in the effect of the program. Boys who were in the program area showed better health as compared to the boys who were in non-ICDS areas. However, there were no positive treatment effects for girls in program area. A possible reason could be due to the fact that girls are not taken to health facilities as much as boys. This has been suggested by other studies as well. Also, gender differences seemed prevalent in spite of higher educated mothers. Mother's education at high levels was found to be a substitute to program for boys.
4. There exist inter-state differences in the effects of ICDS. Though our analysis does not seem to bring this out strongly but there is some evidence to this effect.
5. The program seems to be more beneficial to children who are older. This shows that the program is not being able to reach out the focus age group.
6. Exposure to program affects health positively. The longer the operational age of an AWC, the better the nutritional status of children living in such areas.
7. Being in the program area reduces the probability of being underweight and stunted.
8. Our estimates from regressions are validated by the use more robust technique of propensity score matching.

(ii) *Quality and Utilization of ICDS*: We estimate Logit regressions to predict registration and attendance at AWCs. We reach the following conclusions:

1. As the prosperity increases (as defined by monthly income, standard of living etc.), there is a tendency to not register. This could be due to a preference to a private alternative at higher levels of prosperity. Special efforts should be directed towards middle income & middle education level groups encouraging them to attend.
2. Quality as defined by infrastructure or by people does not affect the registrations or attendance at all. The infrastructural assets like weighing machines are nearly universal but are still not being used. Providing growth charts or weighing machines do not mean much unless the AWW use these devices to monitor health. The functioning of Aganwadi Centre (AWC) needs a better monitoring. Investments should not be done in installing toilets or providing other assets. Program should invest more to motivate the AWW to use the assets which they already have.
3. AWC are fairly universal in their presence. Most people can access in less than 15 minutes which is manageable for most. Increasing the number of centres should not be the first priority in the researched area.

4. AWC are beneficial though respondents do not feel it that way. The incidence of malnourishment goes down into subgroups that attend or are even registered for the program. Most of the mothers of underweight / malnourished children, who even visit AWC regularly do not know that their children are malnourished. This is despite the fact that all the centres have growth charts and operational weighing machines. These are also the centres where AWW claim to be maintaining growth charts. Special drives should be conducted to make people aware so that they can identify a malnourishment.
5. Preventive Health is a latent need. The key reasons for not attending the program are quite frivolous which indicates the lack of seriousness in the minds of respondents towards the program. Preventive Health is a latent need. A lot of effort in educating people would be needed to ensure that this severe need gets the priority in the domestic household.
6. AWW workers are qualified and experienced. Their awareness and knowledge on key issues related to health is quite good. However the knowledge is not being transferred to the respondents. The awareness of mothers on the same issues is very low. Even mothers who register and attend the program are not aware on basic issues of health. This indicates a failure at the moment of truth – AWW fail to communicate with the mothers. Mothers still see traditional channels like elders in the family as a source of information on pregnancy issues.
7. There may be issues related to AWWs motivation or the control and supervision mechanisms of the program. The data also suggests that AWW do not get their honorariums on a periodic basis and it often gets delayed. A massive effort is required on this front. The effort has to be in increasing the incentive as well as making AWW more accountable for the health of the child.
8. A majority of the AWW confirm that they have a supervisor deputed to monitor them who also visits them frequently enough. The efficiency and efficacy of supervision should be studied in detail in the future studies.